



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/800,033	03/15/2004	Peter C. Eklund	025756-00003	6871

4372 7590 10/18/2006  
ARENT FOX PLLC  
1050 CONNECTICUT AVENUE, N.W.  
SUITE 400  
WASHINGTON, DC 20036

EXAMINER

SAVAGE, JASON L

ART UNIT PAPER NUMBER

1775

DATE MAILED: 10/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/800,033

Applicant(s)

EKLUND ET AL.

Examiner

Jason L. Savage

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 14, 15, 22 and 23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 16-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 3-15-06 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20040719</u> .  | 6) <input type="checkbox"/> Other: _____                          |

***Election/Restrictions***

Claims 14-15 and 22-23 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 08-02-06.

***Specification***

The disclosure is objected to because of the following informalities:

In paragraph [0030], "FIG. 1" should be --FIG. 1A--.

There is no brief description of Figure 18 in the brief descriptions of the drawings section.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 4, 6-7, 11, 13 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Masel et al. (US 2003/0198852).

Art Unit: 1775

Masel teaches a hydrogen storage material comprising metal nanoparticles that have a metal core covered by a metal shell or metal coating which may be formed Pt, Pd, Ru, Re, Ir, Au, Ag, Co, Fe, Ni, Y, and Mn (par[0050-0051]). Masel further teaches that the coating may comprise an oxidation resistant material or material which provides catalysis for dehydrogenation such as palladium and ruthenium which is formed on a platinum core (par [0051]).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masel et al. (US 2003/0198852).

Masel teaches what is set forth above but does not exemplify an embodiment wherein the coating is a metal more noble than the core. However, Masel teaches that a wide variety of materials may be used for the core and coating. Masel further teaches the formation of noble metals as the coating layer. Absent a teaching or showing of the criticality of the core being made of a metal less noble than the coating, it would not provide a patentable distinction over the prior art. It would have been within the purview of one of ordinary skill in the art to have selected any of the recited materials for the

Art Unit: 1775

core including materials which were less noble than the coating materials with a reasonable expectation of success.

Regarding claim 5, Masel teaches that the coatings may be provided as multiple coatings such as a first coating of Pd and a second coating of Ru (par[0088]). The recited coatings would meet the limitation of being both oxidation resistant and providing catalysis for dehydrogenation.

Claims 2, 8-10, 12, 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masel et al. (US 2003/0198852) in view of Snow et al. (US 6,589,312).

Masel teaches what is set forth above but is silent to the claim limitations. Snow teaches hydrogen storage materials comprising metal nanoparticles (col. 9, ln. 2-19). Snow also teaches that the nanoparticles may be coated to provide enhanced properties such as improved surface activity and oxidation resistance (col. 10, ln. 5-11 and col. 16, ln. 48-55).

Regarding claims 2, 12, 19, although the references are silent to the storage material being a mixture of nanometer scale platelets and nanometer scale equiaxial particles, Snow teaches that the nanoparticles can be provided in various shapes, structure, material alloying and other intrinsic properties can be controlled and can be combined with the selection of materials, mixtures and alloys to drastically increase the permutations and combinations of possible hydrogen storage systems (col. 11, ln. 6-14). It would have been within the purview of one of ordinary skill in the art to have

Art Unit: 1775

provided mixtures of nanoscale materials including mixtures of particles having varying shapes such as the mixture of platelets and equiaxial particles claimed with a reasonable expectation of success. Absent a teaching of the criticality or showing of unexpected results from the combination of the claimed shapes of nanoparticles, it would not provide a patentable distinction over the prior art.

Regarding claims 8-9, the references are silent to the dimensions of the platelets, however, since the references teach nanoscale particles, it would have been within the purview of one of ordinary skill in the art to have determined what suitable dimensions for the particle could be used with a reasonable expectation of success. Absent a teaching of the criticality or showing of unexpected results from the claimed thickness, face dimension and aspect ratio is merely a design choice and does not patentably distinguish the present invention over the prior art of record. *Eskimo Pie Corp. v. Levous et al.*, 3 U.S.P.Q. 23. *In re Rose* 105 U.S.P.Q. 237. *In re Dailey* 149 U.S.P.Q. 47.

Regarding claim 10, it would have been obvious to one of ordinary skill in the art to have selected any of the disclosed materials suitable for use as the nanoparticles including the use of palladium as claimed.

Regarding claim 17, Snow teaches due to the enhanced activity of the nanoparticles other cheaper or lighter materials may be used including metals of magnesium (col. 10, ln. 18-29). It would have been obvious to one of ordinary skill in the art at the time of the invention to have used magnesium for the core of Masel in order to have formed a cheaper and lighter hydrogen storage material.

Art Unit: 1775

Regarding claim 18, Snow teaches that polymer coatings may be applied such as to help reduce the powder loss or powder blow out during use (col. 10, ln. 9-11). It would have been obvious to one of ordinary skill in the art at the time of the invention to have used polymer coatings on the storage material of Masel in order to help reduce the powder loss or powder blow out during use.

Snow further teaches due to the enhanced activity of the nanoparticles other cheaper or lighter materials may be used including metals of magnesium (col. 10, ln. 18-29).

Snow teaches that coatings containing polymers may be applied to the nanoparticles (col. 10, ln. 7-11).

Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Snow et al. (US 6,589,312) in view of Masel et al. (US 2003/0198852).

Snow teaches hydrogen storage materials comprising metal nanoparticles (col. 9, ln. 2-19). Snow further teaches due to the enhanced activity of the nanoparticles other cheaper or lighter materials may be used including metals of magnesium (col. 10, ln. 18-29). Snow also teaches that the nanoparticles may be coated to provide enhanced properties such as improved surface activity and oxidation resistance (col. 10, ln. 5-11 and col. 16, ln. 48-55).

Snow is silent to the coated nanoparticles having a metal shell or coating. Masel teaches a hydrogen storage material comprising metal nanoparticles that have a metal core covered by a metal shell or metal coating improves the nanoparticles activity as a catalyst (par[0050-0051]). It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the coated nanoparticles of Snow by applying a metal coating as taught by Masel in order to have provided the nanoparticle of Snow with increased activity.

Regarding claims 2, 12, 19, although the references are silent to the storage material being a mixture of nanometer scale platelets and nanometer scale equiaxial particles, Snow teaches that the nanoparticles can be provided in various shapes, structure, material alloying and other intrinsic properties can be controlled and can be combined with the selection of materials, mixtures and alloys to drastically increase the permutations and combinations of possible hydrogen storage systems (col. 11, ln. 6-14). It would have been within the purview of one of ordinary skill in the art to have provided mixtures of nanoscale materials including mixtures of particles having varying shapes such as the mixture of platelets and equiaxial particles claimed with a reasonable expectation of success. Absent a teaching of the criticality or showing of unexpected results from the combination of the claimed shapes of nanoparticles, it would not provide a patentable distinction over the prior art.

Regarding claims 3-4, 6-7 and 16, it would have been obvious to have applied the noble metal coating materials taught by Masel as the coating material on the magnesium core nanoparticle of Snow with a reasonable expectation of success. The



Art Unit: 1775

noble metal coatings would meet the limitation of being oxidation resistant and providing catalysis for dehydrogenation.

Regarding claims 5, 11 and 13, Masel teaches that the coatings may be provided as multiple coatings such as a first coating of Pd and a second coating of Ru (par[0088]). It would have been within the purview of one of ordinary skill in the art to have recognized that multiple coatings could be provided on the nanoparticle core of Snow with a reasonable expectation of success.

Regarding claims 8-9, the references are silent to the dimensions of the platelets, however, since the references teach nanoscale particles, it would have been within the purview of one of ordinary skill in the art to have determined what suitable dimensions for the particle could be used with a reasonable expectation of success. Absent a teaching of the criticality or showing of unexpected results from the claimed thickness, face dimension and aspect ratio is merely a design choice and does not patentably distinguish the present invention over the prior art of record. *Eskimo Pie Corp. v. Levous et al.*, 3 U.S.P.Q. 23. *In re Rose* 105 U.S.P.Q. 237. *In re Dailey* 149 U.S.P.Q. 47.

Regarding claim 10, it would have been obvious to one of ordinary skill in the art to have selected any of the disclosed materials suitable for use as the nanoparticles including the use of palladium as claimed.

Regarding claim 17, Snow teaches the core may be magnesium (col. 10, ln. 25-29).

Regarding claim 18, Snow teaches that polymer coatings may be applied (col. 10, ln. 9-11).

***Allowable Subject Matter***

Claims 20-21 are objected to as being dependent upon a withdrawn base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art teaches what is set forth above and that various materials may be selected to provide a hydrogen storage system with desirable properties. However, the prior art does not teach or suggest a hydrogen storage material comprising palladium platelets having the claimed dimensions mixed with core particles of Magnesium having a shell or coating of palladium formed thereon such as is claimed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1775

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Jason Savage  
10-13-06



JENNIFER C. MCNEIL  
SUPERVISORY PATENT EXAMINER

10/13/06